The role of media literacy in body dissatisfaction and disordered eating: A systematic review

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Abstract

This study comprised a systematic review of literature examining empirical relationships between levels of media literacy and body dissatisfaction and disordered eating. The review aimed to integrate research on this topic. Electronic databases were searched for key concepts: media literacy, body dissatisfaction, and disordered eating. Media literacy measures were coded for consistency with media literacy constructs. Sixteen eligible studies were identified. Cross-sectional outcomes depended upon the media literacy construct assessed. Some relationships between high scores on measures consistent with media literacy constructs and low scores on body dissatisfaction and related attitudes were found. Media literacy-based interventions revealed improvements in media literacy constructs realism scepticism, influence of media, and awareness of media motives for profit, and improvements in body-related variables, but not disordered eating. Further research examining relationships between theoretically-driven media literacy constructs and body and eating concerns is needed. Recommendations are made for evaluating media literacy-based eating disorder prevention.

Keywords: systematic review; media literacy; body dissatisfaction; disordered eating; prevention

The role of media literacy in body dissatisfaction and disordered eating: A systematic review

Media literacy (ML) interventions, which aim to enhance participants' ability to access, analyse, evaluate, and create media (Aufderheide & Firestone, 1993), are recommended to develop critical viewing and thinking in order to reduce vulnerability to negative media influences (Strasburger & Council on Communications and Media Executive Committee, 2010) and enhance health outcomes (J. D. Brown & Bobkowski, 2011). Although ML-based programs are being recommended and implemented to prevent body dissatisfaction and eating disorders (e.g., González, Penelo, Gutiérrez, & Raich, 2011; Wilksch et al., 2015) and cross-sectional research exists that has assessed relationships between an individual's level of ML and body and eating concerns (e.g., Engeln-Maddox & Miller, 2008), the body of research examining empirical relationships between individuals' level of media literacy and body and eating concerns has not been subject to a systematic review. This study aims to a) review research exploring empirical relationships between an individual's level of ML and level of body and eating concerns (i.e., body image, and body- and disordered eating-related constructs), b) review changes following ML interventions in participant's ML and body and eating concerns, and c) integrate the literature into a model of the proposed effects of media literacy on body and eating concerns.

It has been established that media, and particularly advertising, influence attitudes, decision making, and behaviours (Strasburger, Jordan, & Donnerstein, 2010). Depending on its content, media can have harmful consequences, including increased intake of unhealthy food and beverages (Harris, Bargh, & Brownell, 2009; Olafsdottir et al., 2014), experimentation with alcohol and tobacco (Nunez-Smith et al., 2010), violent and aggressive behaviour (Gentile, Coyne, & Walsh, 2011), and, certainly in the short term and possibly in the long term, increased risk for the development of body and eating concerns (Harrison, 2000; Schooler & Trinh, 2011). Specifically, meta-analyses have confirmed that greater

exposure to appearance-focused media in experimental and correlational studies is associated with higher levels of body dissatisfaction and disordered eating attitudes and beliefs in vulnerable individuals (Ferguson, 2013; Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002; Want, 2009).

Rather than relying on legislation to restrict media exposure in order to reduce the negative impact of viewing appearance-ideal images, an alternative approach has been to endeavour to build ML competencies by promoting the development of skills to resist media influence through critical viewing (Hobbs, 1998). Critical viewing is thought to buffer the persuasive influence of media messages (Bergsma & Carney, 2008) by reducing perceived credibility of media messages, thus minimising impact on attitudes and behaviour, thereby leading to better health outcomes (e.g., Pinkleton, Austin, Cohen, Miller, & Fitzgerald, 2007).

Media Literacy and Body and Eating Concerns

Several types of empirical evidence have led researchers to advocate for ML approaches for preventing body and eating concerns (Levine, 2016; McVey, Tweed, & Blackmore, 2005). First, exposure to thin-ideal media images produces elevated body dissatisfaction (e.g., Grabe et al., 2008), prompting consideration of ways to reduce the influence of media. Findings from qualitative studies have indicated that individuals with positive body image actively filter and reject unrealistic media images to protect their body image (Holmqvist & Frisén, 2012; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010), suggesting that building these skills may have a protective effect. Furthermore, the effective application of ML interventions to health risk behaviours such as substance use and violence (e.g., Fingar & Jolls, 2014; Kupersmidt, Scull, & Benson, 2012) suggests that ML interventions could also help prevent other problems such as body and eating concerns. As a consequence of these findings, ML interventions designed to increase the extent to which participants are media literate, and to thereby prevent body and eating concerns, have been

evaluated in controlled studies. The defining features of these "media literacy" interventions have not been clearly specified. However, programs intended to increase ML include content such as raising critical awareness of: examination of positive and negative messages transmitted by media, how media affect people, motivations behind advertising, and ways to respond to media through advocacy. One common feature of these interventions is discussion or demonstration of manipulations used by media to produce flawless and thus, unrealistic human images.

A number of these ML interventions have been found to have positive outcomes for weight and shape concern, thin-ideal internalisation, and risk for disordered eating (González et al., 2011; Mora et al., 2015; Wilksch et al., 2015). However, not all evaluations of ML interventions have assessed the levels of ML of participants at baseline and at post-intervention. Without including actual media literacy assessment it is not possible to quantify the extent to which the intervention effect is a result of an increase in participants' ML rather than some other aspect of intervention involvement (e.g., creating cognitive dissonance or reducing peer pressure to meet appearance ideals).

Sociocultural Model of Body and Eating Concerns: Role for Media Literacy

Despite recent studies responding to calls to implement ML interventions for body and eating concerns (e.g., González et al., 2011; Wilksch et al., 2015), mechanisms by which ML facilitates change in risk and protective factors for body and eating concerns have not been articulated (Levine & Kelly, 2012). The tripartite influence model, a sociocultural model of the development of body dissatisfaction and eating disorders (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), offers a structure for proposing pathways by which ML may relate to body and eating concerns via risk factors for these concerns (see Figure 1). Specifically, ML may disrupt the pathway from media pressure to internalisation of media appearance-ideals and the tendency to compare one's body to others. This may be

hypothesised to occur by reducing the persuasive influence of media and rendering media messages regarding appearance ideals less desirable and less plausible, thus reducing internalisation and comparison of self to media images. Reductions in internalising and comparing, two variables that have been shown to predict increases in body and eating concerns (Jackson & Chen, 2008; Rodgers, McLean, & Paxton, 2015), would then reduce the distal factors, body dissatisfaction and disordered eating.

Media Processing Models and Frameworks

To inform an examination of relationships between ML and body and eating concerns, theoretical models of the relationships between media exposure, media processing, and health outcomes are also important to consider. The message interpretation process (MIP) model (Austin & Meili, 1994) outlines processes by which media messages are interpreted, scepticism is developed, and media messages are accepted or rejected. Media messages that promote unhealthy behaviour are likely to be rejected, and intentions to engage in unhealthy behaviour are likely to be lower, if the messages are perceived as *unrealistic* portrayals of social reality, *dissimilar* to and not reflective of one's experiences of reality, *undesirable* or unattractive portrayals, and if *expectations of positive outcomes* associated with behaviours promoted by media messages are low. In essence, greater scepticism about media messages in relation to each of these concepts is likely to be associated with lower acceptability of those messages and better health outcomes. This model has been supported by cross-sectional studies of alcohol and tobacco advertising effects (Austin, Chen, & Grube, 2006; Scull, Kupersmidt, Parker, Elmore, & Benson, 2010). Further, an MIP-based intervention had positive outcomes for intentions to use tobacco, and effects were mediated by changes in perceived realism of tobacco use advertising and perceived similarity of media portrayals to personal experiences (Kupersmidt et al., 2012).

Another ML framework (Primack et al., 2006; Primack & Hobbs, 2009), unrelated to

the MIP model, has outlined three theoretical ML domains: *authors and audiences* (e.g., understanding that authors create messages for particular purposes), *messages and meanings* (e.g., that messages are subjective and value laden, and use production techniques to influence audiences), and *representation and reality* (e.g., that images and messages can omit information and be inaccurate portrayals). Each domain includes core concepts (see Table 1) representing the multifaceted construct of ML. Proficiency in the core concepts of ML is proposed to lower susceptibility to persuasive media messages and lead to lesser engagement in health risk behaviour (Primack et al., 2006). Cross-sectional associations between high ML and lower odds of smoking and alcohol use in adolescents aged 14-18 years support this model (Chang et al., 2014; Primack & Hobbs, 2009). However, varied relationships between core ML concepts and smoking have been observed. For example, high scores on the concept "media filters reality" were related to lower odds of current smoking, but scores on the concept "messages contain values and specific points of view" were not related to odds for smoking in adolescents (Primack & Hobbs, 2009).

In summary, various models of ML assume that to be media literate is to possess critical thinking skills about: motives of media creators, potential influence of media messages, and credibility of messages, and crucially, to use those skills to construct personally salient meaning (Hobbs, 2011; Potter, 2004). Negating the influence of media that promote health risk behaviours, or unhealthy outcomes, may be achieved through critical examination of media images and messages (Bergsma & Carney, 2008). Both the MIP model (Austin & Meili, 1994) and ML framework (Primack et al., 2006) propose that the persuasive influence of media is reduced when users have the skills to critically examine and thus be sceptical about the realism, similarity, desirability, and positive outcomes of media messages. These approaches also emphasize the importance of having skills to critically deconstruct media in order to recognize, among other things, that media are created for profit and

influence, that media contain specific points of view, and that media may omit pertinent information. It is, however, less clear how this set of capabilities is best measured (Martens, 2010), although self-report measures have been developed that have attempted to capture these critical thinking skills in health risk research and in relation to body and eating concerns (e.g., Irving, DuPen, & Berel, 1998; Primack et al., 2006; Scull et al., 2010).

Summary and Aims

Although higher levels of ML have been assumed to protect against the negative impact of idealised appearance media on body and eating concerns and although there have been reviews of the potential of ML approaches to be effective in prevention of these concerns (Levine & Kelly, 2012) and of outcomes for body and eating concerns from participation in ML interventions (Wilksch & Wade, 2015), there has not been a review of the relationship between body and eating concerns and ML as an individual difference variable (i.e., a trait). Within such a review it would be important, first, to assess for the presence of a relationship between ML and body and eating concerns in cross-sectional and prospective research. This is the first aim of the present review. In line with the postulated role for ML outlined above, greater ML is expected to be associated with less media ideal internalisation and appearance comparison, and less body dissatisfaction and disordered eating.

Variation in the constructs of ML used in this research may influence relationships found with body and eating concerns in that higher levels of one construct from the MIP model or ML framework may be related to lower body and eating concerns, whereas levels of another of the MIP or ML framework constructs may be unrelated to levels of body and eating concerns. Such varied relationships have been observed for smoking, as described above. Thus, a subsidiary aim was to review the impact of how ML is conceptualised (e.g., consistency of ML measures with components of the MIP model or core concepts of the ML framework) on patterns of relationships with outcome variables, and to clarify the constructs

of ML most relevant for evaluation in this field. Therefore, ML measures used in reviewed studies, including their psychometric properties, will be examined.

The second main aim of the study is to identify the role of individuals' ML in preventing body and eating concerns. A recent review of published prevention programs concluded that ML programs with particular characteristics, such as being targeted at universal, early adolescent audiences and having long duration, produced positive outcomes (Wilksch & Wade, 2015), however, in that review actual outcomes on participants' ML were not examined. It is not our aim to replicate this review of outcomes for body and eating concerns variables, but rather to extend these findings by attempting to establish the specific role of improving ML in interventions producing positive outcomes for body and eating concerns. Therefore, single- and multi-session ML interventions which have assessed not only changes in body and/or eating concerns but also participants' levels of ML following the intervention will be examined. This aim addresses the need to understand whether "prevention programs can increase media literacy… and in turn reduce or delay development of proximal risk factors" (Levine & Murnen, 2009, p. 32). It was expected that ML approaches would both increase ML and reduce body and eating concerns and that the latter reductions would be mediated by changes in ML.

Method

This review was conducted in accordance with the PRISMA guidelines for reporting systematic reviews (Moher, Liberati, Tetzlaff, Altman, & Group, 2009).

Eligibility Criteria

Eligibility criteria were as follows: (a) English language peer-reviewed studies. Non-peer-reviewed studies (e.g., dissertations), were excluded as search and selection procedures for these studies can introduce bias (Ferguson & Brannick, 2012); (b) cross-sectional, prospective or experimental studies that had at least one measure of ML and at least one

measure of body image or disordered eating or a related construct (e.g., appearance comparison). To evaluate empirical relationships between an individual's level of ML and level of body and eating concerns, studies needed to assess both constructs. Since this is the first known review of this area, studies of varying design (cross-sectional, prospective, experimental including intervention evaluations) were included to fully explore relationships of interest; (c) original data were presented. Studies without original data, such as reviews or commentaries, were excluded. A publication date range was not specified, although the first known paper to link the fields of ML and eating disorders was published in 1996 (Levine, Smolak, & Schermer, 1996) and it was not expected that eligible studies would be identified prior to this date.

Data Sources and Search

Two electronic databases, PsycInfo (Ovid) and Web of Science (ISI) were searched for eligible studies addressing the concepts of (a) body dissatisfaction, (b) eating disorders or disordered eating, and (c) media literacy. Body dissatisfaction terms searched for included: [(body image OR body OR weight OR shape) AND (dissatisfaction OR disturbance OR concern OR preoccupation OR attitudes OR satisfaction OR esteem OR appreciation)]. Disordered eating terms were: [eating disorders OR disordered eating]. The ML concept terms were: [(media OR mass media OR media exposure OR social media) AND (media literacy OR critical OR critical thinking OR analysis OR critical analysis)]. Keyword searches and subject heading searches were conducted. The first database search was conducted on 14 July 2014 and updated 15 July 2015. Reference lists of selected studies were searched for relevant records, and cited reference searches of selected studies also conducted.

Study Selection and Data Collection

Identified records were selected by the first author following three levels of screening: title, abstract, and full-text review. Data were collected from selected studies and recorded on

a standardised form including: author, publication date, journal, country, aims, design, sample size, sample age, participant gender (% female), ML measure, body and eating concerns measure, measures' psychometric properties, and summary of results including effect sizes (*d*) taken directly from publications or calculated from standard formulae.

Face Validity: Categorization of Media Literacy Concept

The first and second authors independently reviewed descriptions of measures and individual items to categorise the ML measures, collectively termed here media processing measures, according to consistency with the MIP model (Austin & Meili, 1994) and ML framework (Primack et al., 2006) described above and in Table 1. Where measures were not consistent with ML concepts, an alternative non-ML concept was identified if the items from the measure appeared to map onto other recognisable concepts within the body and eating concerns literature. Information in Table 1 also describes proposed relationships of ML and additional concepts to body and eating outcomes. It is expected that higher media scepticism and higher proficiency in ML framework core concepts would be related to lower media persuasion which in turn would be related to lower body and eating concerns. Interrater reliability (kappa = .89) for categorisation of measures was substantial (Landis & Koch, 1977).

Results

Study Selection

The original database search revealed 731 unique records. An additional 123 records were identified through reference list and cited reference searches, resulting in a total of 854 records screened for eligibility. The title screen excluded 480 papers and a further 302 were excluded after abstract review. Full-text review was conducted on 72 papers, 56 of which were excluded because: the study did not contain a ML (n = 40) or body or eating concerns (n = 2) measure, the study did not contain a ML measure and did not contain a body or eating

concerns measure (*n* = 9), the study did not present original data (*n* = 4), or the paper reported on the same sample as a publication already included (*n* = 1). Sixteen papers met eligibility criteria for inclusion. Figure 2 shows the original review process flow diagram. The updated search of 124 unique records found no additional eligible papers. See the Supplementary Materials linked online to this article.

Study Characteristics

Half (*n* = 8) of the 16 studies included in the review were cross-sectional, seven were evaluations of interventions to improve body and eating concerns, and one was an experimental study of the effects on body dissatisfaction of exposure to thin-ideal media. No prospective studies met inclusion criteria. The publication date range was 1998 to 2013.

Most (*n* = 12) of the included studies assessed samples of females only, whereas none comprised males only. Participants' ages varied: three studies had pre-adolescent samples; five had adolescent samples; six had college-age samples, one had a non-college adult sample (mean age mid-30s), and two had multiple cohorts, e.g., children and their parents. Thirteen studies were conducted in the United States, three in Australia, and one in Israel.

Measurement of Media Literacy

All media processing measures were self-report and most studies (*n* = 11) assessed processing of images. Others (*n* = 5) had a broader content focus. Ten studies used one measure, six had multiple measures. Nine studies (56%) used measures developed by the authors or adapted other scales for their study. Existing measures were used in five studies (31%). Two studies (13%) used participant generated data from thought listing tasks.

Scale descriptions. The Media Attitudes Questionnaire (Irving et al., 1998) derived from the MIP model (Austin & Meili, 1994) was used in three studies (Irving & Berel, 2001; Irving et al., 1998; McLean, Paxton, & Wertheim, 2013). A sample item is "Real women look like models in ads". Two studies (Neumark-Sztainer, Sherwood, Coller, & Hannan,

2000; Sherwood & Neumark-Sztainer, 2001) used items adapted from the Sociocultural Attitudes Towards Appearance Questionnaire (Heinberg, Thompson, & Stormer, 1995) to assess knowledge of the influence of media on body image and eating. A sample item is "Some advertisements in magazines or on TV make people think they should go on a diet." Two studies (Botta, 1999, 2003) used a measure described as critical viewing and questioning of media. A sample item is "I question why the models need to have such perfect bodies." The remaining studies used various measures or items to assess ML.

Psychometric properties of media literacy measures. For the majority of scales used to assess media literacy constructs, little information about psychometric properties was presented. Cronbach's alpha for internal consistency was presented in 11 of the 16 (69%) included studies. The range of values for the 20 scales was $\alpha = .62$ to $\alpha = .92$, with values $< .70$ for three (15%) scales; values between .70 and .79 reported for seven (35%) scales and $\geq .80$ for 10 (50%) scales. Internal consistency was not reported for four studies for which it was inappropriate.

Adequate test-retest reliability (range: $r = .67$ to .86), construct validity, and factor structure was demonstrated for the Critical Processing of Beauty Images measure (Engeln-Maddox & Miller, 2008). The factor structure of items from the Media Attitudes Questionnaire was presented in another study (McLean et al., 2013). Also presented was interrater reliability (kappa = .88) for one study that used the thought-listing technique (Engeln-Maddox, 2005). The authors of one study which used an unspecified number of media processing items stated that validity was "supported by a panel of experts" (Kater, Rohwer, & Levine, 2000, p. 10) but did not provide illustrative data.

Face validity: Categorization of media literacy concepts. Face validity of measures was investigated to determine how measures used in studies fit with the MIP model and ML framework. The most frequently categorised concept, used in eight (50%) studies, was

Realism Scepticism (also including *Filter)* from both the MIP model and ML framework, corresponding to scepticism about how realistic media images are and considering that media messages filter reality (Tables 2 and 3). A sample item is “That kind of perfection isn’t real” (Engeln-Maddox & Miller, 2008). The concept *Influence*, i.e., recognising that media influence attitudes and behaviours, from the ML framework, was used in six (38%) studies. A sample item is “Advertisements often encourage people to take risks with their health” (Zucker, Stewart, Pomerleau, & Boyd, 2005). The concept *Similarity Scepticism,* from the MIP model, was used in five (31%) studies. Sample items are “I question why the models don’t look more like how my friends and I look” (Botta, 1999, 2003) and “most women could be as thin as the models in ads by exercising and /or dieting” (reversed scored; Irving & Berel, 2001). Each MIP concept (Austin & Meili, 1994) was assessed in at least one study, whereas only three (of seven) core ML framework concepts (Primack et al., 2006) were assessed in the reviewed studies.

Although all measures were described by the study authors as assessing ML, critical media viewing/processing, or media interpretation, some measures were categorised in the present review as assessing non-ML concepts. Six studies (38%) used measures appearing to assess *Attention,* which relates to attention to appearance and or eating content. Sample items are “She’s too skinny to be healthy” (Engeln-Maddox & Miller, 2008) and “I notice how much the characters eat or do not eat” (Nathanson & Botta, 2003). Measures used in three studies (19%) were categorised as assessing *Internalisation* of the thin-media ideal, as in, “Women who appear in television shows and movies project the type of appearance that I see as my ideal” (Botta, 1999). These non-ML concepts were not expected to be related to body and eating concern variables in the same manner as the critical thinking measures that aligned with ML concepts. Rather, consistent with the nature of these variables which reflect endorsement of, rather than critical attitudes towards media presentations, it would be

expected that higher scores for attention and internalisation of the thin-media ideal would be related to higher scores for body and eating concerns. In addition, eight (of 29) measures used across studies were categorised as assessing more than one concept, such as similarity scepticism and attention.

Measurement of Body and Eating Concerns

All studies included a measure of body image, with most (*n* = 12, 75%) assessing dissatisfaction or appearance concern. Body-related attitudes such as internalisation of the thin-ideal and appearance comparison were also frequently assessed (*n* = 8, 50%, and *n* = 5, 31%, respectively). Eight studies (50%) assessed disordered eating variables including bulimia symptoms, dieting, and other weight loss behaviours. The measures are shown in Tables 2, 3, and 4. Most measures of body image (*n* = 29, 91%) were established scales for which adequate psychometric properties had previously been demonstrated. This was also the case for measures of body-related attitudes (*n* = 21, 88%), whereas for measures of disordered eating, established scales comprised half (*n* = 9, 50%) of the 18 measures used. The other body image, body-related attitudes, and disordered eating measures used across studies were developed by authors for their studies (*n* = 3, 9%; *n* = 3, 12%; *n* = 9, 50% respectively).

Cross-sectional Relationships Between Media Processing and Body and Eating Concerns Variables

MIP model and ML framework constructs. Findings for cross-sectional relationships between body and eating concerns and media processing measures that assess, at least in part, constructs consistent with the MIP model or ML framework, are presented in this section. For these media processing measures, high scores reflect high levels of media scepticism (for MIP constructs) or high levels of critical viewing (for ML framework

constructs). For example, a high score for realism scepticism reflects high levels of scepticism about the reality of media content.

Regarding the first major aim, mixed findings were revealed for cross-sectional studies that examined relationships between media processing and body and eating concerns as shown in Table 2. Two studies found that high scores on media processing measures were associated with low body and eating concerns scores, consistent with expectations. High scores on a measure assessing realism scepticism, similarity scepticism, and desirability scepticism were associated with low scores for weight and shape concern, thin-ideal internalisation, and upward appearance comparison (McLean et al., 2013). High scores on a measure assessing realism scepticism, influence, and attention were associated with high scores for downward appearance comparison (Engeln-Maddox, 2005). Effect sizes were medium to large.

In contrast, three studies found high scores on processing measures were associated with more body and eating concerns. High scores on a measure assessing both similarity scepticism and attention were associated with greater body dissatisfaction, drive for thinness, and bulimia in adolescent girls (Botta, 1999), and in a young adult sample with body dissatisfaction for females but not males, and with drive for thinness, desire for muscularity, bulimia, and anorexia in females and males (Botta, 2003). Further, in young adult women, high scores on a measure of both influence and attention were associated with greater body dissatisfaction, media as an information source about appearance, perceived media pressure to look like media appearance ideals, and internalisation of the thin-ideal and athlete ideal (Engeln-Maddox & Miller, 2008). Effect sizes were medium to large.

Two studies (Sherwood & Neumark-Sztainer, 2001; Zucker et al., 2005) found null results. Scores on a measure of media influence and expectancies did not differ between adolescent female dieters and non-dieters (Sherwood & Neumark-Sztainer, 2001), and scores

on a media processing measure capturing the filter, influence, and values concepts were not significantly associated with weight concern (Zucker et al., 2005).

Attention and internalisation constructs. Findings for cross-sectional relationships between body and eating concerns and media literacy measures that solely assessed constructs inconsistent with the MIP model or ML framework are presented in this section. For these measures, high scores reflect high levels of attention to thin-ideal or eating media content or high internalisation of the thin-ideal and, as noted above, could be expected to be associated with high body and eating concerns as they do not reflect critical thinking about or scepticism towards media presentations. Consistent with this idea, high scores on a scale assessing attention as a single concept were associated with more internalisation of athletic ideals for college age women (Engeln-Maddox & Miller, 2008) and with greater drive for thinness for adolescent girls and boys (Nathanson & Botta, 2003). High scores on a media processing measure categorised as assessing attention and internalisation were associated with greater body dissatisfaction, drive for thinness, and bulimia in adolescent girls (Botta, 1999).

Impact of conceptualisation of media literacy on relationships with body and eating concerns variables. In line with the subsidiary study aim, to uncover the impact of type of media processing measurement on relationships with body and eating concerns, we categorised the observed relationships for measures consistent with the MIP model and ML framework according to the measure of media processing used and conducted Fisher's exact probability tests to determine if differences between observed results were statistically significant.

For measures that assessed realism scepticism, 14 associations were tested and four (29%) revealed associations consistent with our expectations, i.e., recognition that media images and messages distort reality (higher realism scepticism) was associated with lower

body and eating concerns scores (Engeln-Maddox, 2005; McLean et al., 2013), 10 (71%) were null results (Engeln-Maddox, 2005; Engeln-Maddox & Miller, 2008), and zero associations were in the direction opposite to that expected. Outcomes were mixed for the similarity scepticism and influence concepts. For similarity scepticism, three of 16 (19%) associations tested were in the expected direction (McLean et al., 2013), two (13%) were null results (Botta, 1999, 2003), and 11 (69%) were in the non-expected direction (Botta, 1999, 2003). For influence, one of 11 (9%) associations tested was in the expected direction (Engeln-Maddox, 2005), four (36%) were null results (Engeln-Maddox, 2005; Zucker et al., 2005), and six (55%) were in the direction opposite to that which had been predicted (Engeln-Maddox & Miller, 2008).

Fisher's exact tests compared the measured MIP model and ML framework constructs on the proportion of outcomes that were: in the expected direction versus null results versus in the non-expected direction. There were significant differences between realism scepticism and influence ($p < .01$), and realism scepticism and similarity scepticism ($p < .001$), but not between influence and similarity scepticism ($p = .454$). The results indicated that the type of media processing measure did impact relationships with body and eating concerns. Most relationships with measures assessing similarity scepticism and influence were in the direction opposite to predictions: thus, higher levels of processing in relation to recognising influence of media on attitudes and behaviour and perceptions of similarity of the self to media were associated with greater body and eating concerns. However, assessment of similarity often included overlapping constructs, such as attention, which may have contributed to these results. In contrast, no relationships with measures of realism scepticism were in the direction opposite predictions. Ambiguity in measures in relation to assessment of overlapping constructs and lack of psychometric data, particularly in relation to validation, necessitates caution in interpreting results.

Outcomes of ML Intervention Studies

Regarding the second major aim, to examine the media processing and body and eating concerns outcomes of ML interventions, seven studies were identified that conducted evaluations of ML interventions which aimed to improve body and eating concerns and which assessed both change in levels of ML and change in levels of body and eating concerns. Outcomes from studies were interpreted only if the design had a control group and appropriate inferential statistics were conducted to compare differences between experimental groups adjusting for baseline levels of the variable of interest.

Media processing outcomes. For change in media processing, outcomes from four studies that met these criteria were interpreted (Golan, Hagay, & Tamir, 2013; Irving & Berel, 2001; Neumark-Sztainer et al., 2000; Richardson, Paxton, & Thomson, 2009). Consistent with our expectations, significant improvements in media processing were observed for the intervention relative to control groups in three of four studies (75%), and improvements at trend level were found in the fourth study (see Table 3). Media processing variables that showed improvement were: profit, from baseline to three-month follow-up (Golan et al., 2013); realism scepticism, similarity scepticism, and desirability scepticism, from baseline to post-program (Irving & Berel, 2001); techniques, from baseline to post-program and baseline to three-month follow-up (Richardson et al., 2009); influence (trend improvement) from baseline to post-program (Richardson et al., 2009); and influence and expectancies (trend improvement), from baseline to post-program and baseline to three-month follow-up (Neumark-Sztainer et al., 2000). Effect sizes were small to large.

It was not possible to compare outcomes for media processing according to length of ML content in interventions, as the four studies for which outcomes were interpreted used different assessment measures. However, we did consider effect sizes for media processing outcomes and found no apparent pattern between the size of the effect for change in media

processing and the length of program content dedicated to ML. For example, small improvements were found for media processing for both the program with the greatest ML content (3 x 90 minutes, *d* = 0.26 to 0.35; Neumark-Sztainer et al., 2000) and also for the program with moderate ML content (1 x 90 minutes; *d* = 0.33 to 0.37; Golan et al., 2013). Small to large effect sizes were found for programs with relatively brief ML content (1 x 45 minutes; *d* = 0.75 to 1.36; Irving & Berel, 2001; 1 x 50 minutes; *d* = .38 to .87; Richardson et al., 2009).

Body and eating concerns outcomes. The same criteria regarding use of a control group and adjustment for baseline levels of outcome variables were applied for interpreting body and eating concerns outcomes. Outcomes from three studies were interpreted (Golan et al., 2013; Neumark-Sztainer et al., 2000; Richardson et al., 2009), in which improvements were found for some, but not all variables. Improvements were observed for drive for thinness in girls and boys from baseline to three-month follow-up (Golan et al., 2013), internalisation of the thin-ideal for girls at post-program (Richardson et al., 2009) and three month follow-up (Neumark-Sztainer et al., 2000), body size acceptance for girls at post-program (Neumark-Sztainer et al., 2000), and body satisfaction for boys at post-program and three month follow-up (Richardson et al., 2009). Effect sizes were small to large. No improvements were found for any of the disordered eating variables. See Table 3.

Outcomes for the intervention studies reviewed demonstrated improvements in media processing and body concerns variables for college age women and adolescent participants, both boys and girls. For the three studies finding improvements in body image variables, improvements in the media processing variables profit, techniques, influence, and influence/expectancies were also found. In none of these studies were analyses undertaken to determine if change in media processing mediated (i.e., contributed to) change in body image outcomes.

Experimental Study Outcomes

One experimental study was identified (Tiggemann, Slater, Bury, Hawkins, & Firth, 2013), which compared outcomes of viewing thin-ideal media images in groups in which participants did or did not view warning labels regarding digital alteration of images. Female participants (N = 114, M_{age} = 20.0, SD = 2.7) rated at post-viewing how realistic they perceived the appearance of models to be using the perceived realism scale (Tiggemann et al., 2013). Groups did not differ on realism ratings. Analyses were not conducted to examine if realism was related to change in body satisfaction from pre-to post-image viewing.

Discussion

Enhancing individuals' media literacy, defined as the ability to access, critically evaluate, and create media (Aufderheide & Firestone, 1993), has been promoted as a method to prevent body dissatisfaction and eating disorders. The aim of this review was to systematically examine empirical relationships between level of ML and level of body and eating outcomes, including evaluating change in level of ML and body and eating concerns following ML-based interventions, to better understand the role of ML skills in protecting against body and eating concerns. The review included 16 eligible cross-sectional, intervention, and experimental (including intervention evaluations) studies.

With respect to cross-sectional relationships evident in surveys, mixed findings emerged. The expectation that greater ML would be associated with lower body and eating concerns was supported by two of the seven cross-sectional studies that used ML constructs (Engeln-Maddox, 2005; McLean et al., 2013). In relation to intervention studies, there was partial support for the expectation that ML interventions would increase ML and reduce body and eating concerns. A diverse range of ML constructs improved from baseline to post-program and in some cases, also to three month follow-up. Further, body-related outcomes were improved. Specifically, positive outcomes for body satisfaction in boys (Richardson et

al., 2009), internalisation of the thin-ideal in girls (Richardson et al., 2009), body size acceptance in girls (Neumark-Sztainer et al., 2000), and drive for thinness in girls and boys (Golan et al., 2013) were revealed following ML interventions that also increased ML. Eating outcomes were not improved in any study. Interestingly, no studies reviewed analysed whether ML variables mediated positive outcomes. Consequently, we could not examine if reductions in body and eating concerns were explained by changes in ML.

Not including evaluations of interventions, only one of the reviewed studies used an experimental design. There was no evidence that realism scepticism was increased following viewing of warning labels on images of thin models (Tiggemann et al., 2013).

Impact of measurement. Although the cross-sectional outcomes were not strongly supportive of expected findings, results from examination of the impact of the particular ML conceptualisation on the pattern of relationships with outcome measures, suggest that outcomes were dependent upon the concept assessed. For relationships in the expected direction, where greater ML was associated with lower body and eating concerns, the measures used in analyses reflected the constructs realism scepticism, similarity scepticism, desirability scepticism, and influence, from the MIP model and ML framework (Austin & Meili, 1994; Primack et al., 2006; Primack & Hobbs, 2009). Significantly more outcomes for realism scepticism were in the expected direction than for similarity scepticism and influence. However, due to the proportion of null relationships found for these constructs, the results must be considered preliminary and interpreted with caution.

In contrast, media processing categorised as reflecting internalisation of the thin-ideal or attention to appearance and or eating content in media, were associated with higher body and eating concerns. It was somewhat surprising that these concepts were identified in the reviewed literature, as they do not appear to reflect critical processing of media and are perhaps more consistent with recognising, or being more aware of thin-ideal content in

media. Furthermore, in some studies, data supporting the construct validity of these measures in relation to media processing was not presented (Botta, 1999, 2003; Nathanson & Botta, 2003), thus it cannot be concluded that these scales are valid measures of ML. Consistent with research showing that heightened attention to thin-ideal images exacerbates body concerns (A. Brown & Dittmar, 2005), these findings suggest that media processing that draws attention to appearance and eating content may highlight discrepancies between the viewer's perceived appearance and appearance ideals portrayed in media, thus contributing to heightened body dissatisfaction. Consideration of the potential for increased body dissatisfaction resulting from attention to media appearance ideals is required by interventionists delivering ML programs. Participants in these programs might find their awareness of ideals, and thus their body dissatisfaction, enhanced through presentation of visual material that, while highlighting the techniques and strategies used by media to create unrealistic appearance ideals, by default, also involves increased exposure to these ideals. Such material needs to be delivered with care to ensure that exposure is balanced with sufficient critical analysis to reduce the persuasive influence of exposure to these media appearance ideals.

Findings for similarity scepticism from cross-sectional and intervention studies appear to be somewhat contradictory. Most cross-sectional findings showed that greater similarity scepticism was associated with greater body and eating concerns (although some findings in the opposite direction were also observed). In contrast, ML intervention programs often aim to increase similarity scepticism as a means of reducing or preventing body concerns and in fact, similarity scepticism has been shown to improve (increase) following participation in a ML intervention (Irving & Berel, 2001). One explanation for these mixed findings is that the assessment of similarity scepticism in cross-sectional studies often overlapped with other constructs, particularly attention, thus relationships between similarity scepticism and

outcome variables may have been confounded by the presence of other constructs within the measures. It is also possible that the similarity scepticism construct, while applicable to other health risk behaviours, has a less straightforward relationship with body concerns. From a media processing theory perspective, evaluating oneself as dissimilar to thin- or muscular-ideal images in advertising (high similarity scepticism) reflects *critical thinking processes* and an understanding that media images are highly constructed and that, in real life, people are highly unlikely to look similar to the highly manipulated images. Such a critical perspective can be protective for body image in that the media-depicted ideals would be less likely to be internalised or considered as appropriate targets for comparison (Halliwell, Easun, & Harcourt, 2011; Posavac, Posavac, & Weigel, 2001). On the other hand, simply evaluating oneself as dissimilar to media portrayals *in the absence of a critical perspective* directed at the media message, may reflect a simple identification that the individual perceives themselves to be discrepant from current media ideals for appearance. Under these circumstances, body dissatisfaction is likely to result. Furthermore, recognition of oneself as dissimilar to appearance ideals portrayed by models may not reduce attention to, or comparison with such ideals, particularly when the motivation for appearance comparison is self-enhancement. These varied interpretations of the implications of similarity media processing measures suggests that further work is required for developing similarity scepticism measures for application to body and eating concerns research which reflect the critical component and not merely discrepancies from or disapproval of media appearance ideals (Want, Vickers, & Amos, 2009).

Conversely, media processing that involves critical analysis to lessen the perceived credibility of media through increasing realism scepticism, and recognising the persuasive effects of media (influence), consistent with the ML approach, appears to be relevant for body image concerns as this type of processing can potentially disrupt unfavourable

comparisons between the self and media images, and reduce internalising media appearance standards as one's own, thus reducing body concerns. Results consistent with this contention were found from cross-sectional and intervention studies. Although cross-sectional results were not strongly supportive, they do suggest that of the ML concepts, realism scepticism appears to have the most potential to pursue in future research. Critical thinking in this domain may enhance the development of more realistic appearance ideals both for the self (Neumark-Sztainer et al., 2000) and in relation to media images (Halliwell et al., 2011). Our findings underscore the importance of being clear about the constructs of ML that are being assessed with each measurement tool, and also being clear about the constructs that are targeted in ML interventions, however, further research is needed to consolidate empirical support for the small number of expected relationships that have been revealed in this study.

Implications for Media Literacy Models

Evidence from reviewed studies provides preliminary support for elements of the proposed ML model (Figure 1), whereas other elements are untested. Relationships between higher ML and lower thin-ideal internalisation, appearance comparison, and body dissatisfaction (McLean et al., 2013) and higher downward comparison (Engeln-Maddox, 2005), support the model's basic premises. However, the moderation component of the model could not be evaluated as analyses of this type were not conducted in any reviewed papers. Refinement of ML models may benefit from considering other critical social perspectives which emphasise taking a critical stance towards cultural pressures on appearance, including those emanating from peers, family, and other cultural institutions (Piran, 2010). Feminist ideology is one such critical social perspective and has been shown to be related to positive body image (Murnen & Smolak, 2009), and thus offers a lens through which ML, also considered to be a critical social perspective (Levine, 2016), can be examined in relation to body and eating concerns.

Relationships between eating concerns and ML were infrequently assessed and none of the ML interventions improved eating outcomes. Regarding the latter point, only one intervention included eating-related ML content (Neumark-Sztainer et al., 2000). The other interventions focused on appearance- or general-ML content (Golan et al., 2013; Richardson et al., 2009). Thus, it is not surprising that eating outcomes were not improved when they were not targeted in the intervention content. This observation is consistent with the recommendation that "researchers should be more explicit about the media literacy core concepts/skills they include in their intervention" (Bergsma & Carney, 2008, p. 540).

The review also found that none of the intervention studies examined change in body and eating outcomes in relation to change in ML, the putative mechanism by which improvements occur in ML-based programs. Although improvements in both body concern outcomes and ML occurred (Golan et al., 2013; Neumark-Sztainer et al., 2000; Richardson et al., 2009), it cannot be concluded that body-related improvements resulted from changes in ML due to the intervention. Extensive program evaluation, including tests of mediation, as has been conducted in evaluations of smoking interventions based on the MIP model (Kupersmidt et al., 2012), are needed to clarify the utility of ML approaches for preventing body and eating concerns.

Limitations of the Review Findings and Methodology

The review findings were limited by the extent to which identified studies conducted analyses consistent with the research aims. For example, ML is assumed to disrupt appearance comparison processes (Botta, 1999; Halliwell et al., 2011; Posavac et al., 2001), therefore, it was somewhat surprising that few studies examined relationships between appearance comparison and ML. As noted above, intervention studies did not assess mediation of outcomes, therefore, this aspect of the study could not be investigated.

The eligibility criteria excluded ML-based body dissatisfaction and eating disorder

prevention studies which did not assess individual levels of ML (e.g., González et al., 2011; Halliwell et al., 2011; Wilksch et al., 2015). This criterion was selected to enable examination of the empirical relationship between ML and body and eating outcomes; if ML is not assessed, it cannot be ascertained whether an intervention has modified ML. However, it should be noted that other ML body and eating concern interventions have been reported and a review of their effects on body and eating concerns outcomes has recently been conducted (Wilksch & Wade, 2015).

Conclusions and Recommendations for Future Research

This review's findings advance our understanding of the relationship between ML and body and eating concerns, but a number of areas remain unclear and other important issues have yet to be investigated. The review has established that the realism scepticism concept has the most consistent relationships with body and eating concerns, in the directions that were expected, but patterns in relationships between levels of ML and levels of body and eating concerns depended on the ML concept measured. Mixed findings for directions of relationships between ML constructs (e.g., similarity scepticism and influence) and the overlap between assessed constructs, highlight that the best way to assess the extent to which an individual is media literate remains unclear. Furthermore, a number of core concepts of the ML framework, such as "authors target specific audiences", "different people interpret messages differently", and "messages omit information," have not been assessed in research in this field, hence it is unknown whether those concepts are relevant to this field. Thus, development of measures yielding valid and reliable scores is essential for use in body and eating concerns research (Martens, 2010). Advances in other areas of ML assessment (Primack et al., 2006; Scull et al., 2010) could guide such endeavours.

The review has also established that improvements in levels of ML and levels of body related variables, but not eating-related variables, can result from participation in ML-based

interventions that also improved levels of participants' ML. However, limitations in scope and analyses of reviewed studies point to several recommendations for future research. First, methodological rigour is required regarding use of a randomised controlled design and controlling for baseline levels of variables in analyses. Second, ML interventions need to be based on a sound theoretical framework of ML processes as related to body and eating concerns. Third, interventions must identify and target ML constructs relevant to body and eating concern change. Fourth, levels of ML must be assessed to ascertain whether ML-based interventions do increase ML. Fifth, ML measures reflecting specific ML theory constructs as applied to body and eating concerns research need further development, and sixth, outcome evaluations need to assess whether change in ML explains improvement in body and eating outcomes through mediation analyses as this important process has yet to be examined in ML intervention research. These steps are vital to provide confidence in recommending ML-based prevention interventions for body dissatisfaction and disordered eating.

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Table 1

Concepts Assessed by Media Processing Measures and Proposed Relationships to Body and Eating Concerns

Media literacy concepts and description	Abbreviation	Proposed relationship to body and eating concerns
Media messages and images are unrealistic and inaccurate (MIP)	Realism scepticism	High realism scepticism = low body and eating concerns
Similarity of media messages and images to one's experiences (MIP)	Similarity scepticism	High similarity scepticism = low body and eating concerns
Desirability of media portrayals (MIP)	Desirability scepticism	High desirability scepticism = low body and eating concerns
Expectancies of positive outcomes (MIP)	Scepticism about Expectancies	High scepticism about expectancies = low body and eating concerns
Authors create media messages for profit and or influence[a] (MLF)	Profit	High recognition of profit = low body and eating concerns
Authors target specific audiences[a] (MLF)	Target	High recognition of audience targeting = low body and eating concerns
Messages contain values and specific points of view[b] (MLF)	Values	High recognition of values = low body and eating concerns
Different people interpret messages differently[b] (MLF)	Interpretation	High recognition of different interpretation = low body and eating concerns
Messages affect (influence) attitudes and behaviours[b] (MLF)	Influence	High recognition of influence of media = low body and eating concerns
Multiple production techniques are used[b] (MLF)	Techniques	High recognition of production techniques = low body and eating concerns
Messages filter reality[c] (MLF)	Filter	High recognition of reality filtering = low body and eating concerns
Messages omit information[c] (MLF)	Omission	High recognition of omission of information = low body and eating concerns
Additional non-media literacy concepts and description	**Abbreviation**	
Attention to body image and/or eating content in media	Attention	High attention = high body and eating concerns
Internalisation of the thin/media ideal	Internalisation	High internalisation = high body and eating concerns

MIP = message interpretation process model (Austin & Meili, 1994)

MLF = Media Literacy Framework (Primack et al., 2006; Primack & Hobbs, 2009)

[a] = authors and audiences domain; [b] = messages and meaning domain; [c] = representation and reality domain

Table 2

Characteristics and Results of Cross-sectional Studies Included in the Review

Study	Age group (mean years)	Media-processing measure[z] (concept(s) assessed)	Body image and related measures	Eating measures	Results
Botta (1999) *N* = 214 Gender F 100%	Adol. (15)	Critical viewing[y] (Attention; Similarity scepticism) Media images as realistic ideal[y]; (Internalisation; Attention)	EDI-BD EDI-DT	EDI-B	Higher scores for Similarity scepticism & Attention and Internalisation & Attention associated with greater body dissatisfaction (EDI-BD; *d* = 0.35; *d* = 0.54) and disordered eating (EDI-B; *d* = 0.45; *d* = 0.49). Higher scores for Internalisation & Attention also associated with greater drive for thinness (EDI-DT; *d* = 0.77). Null results for other relationships.
Botta (2003) *N* = 397 Gender F 51%	Adol/Adult (19)	Critical viewing (Attention; Similarity scepticism)	EDI-BD EDI-DT MUSC[y]	EDI-B ANB[y]	Girls: Higher scores for Similarity scepticism & Attention associated with lesser body satisfaction (EDI-BD; *d* = 0.70) and greater drive for thinness (EDI-DT; *d* = 0.80) disordered eating (EDI-B; *d* = 0.77, ANB; *d* = 0.93), and muscularity (MUSC *d* = .41). Boys: Higher scores for Similarity scepticism & Attention associated with greater drive for thinness and desire for muscularity (EDI-DT; *d* = 0.80, MUSC *d* = 0.39) and disordered eating (EDI-B; *d* = 0.85, ANB; *d* = 0.68), but not body satisfaction (EDI-BD).
Engeln-Maddox (2005) *N* = 202 Gender F 100%	Adult (18)	Critical processing[x] (Realism scepticism; Attention; Influence)	EDI-BD MBSRQ – AE MBSRQ - AO SATAQ-I NACT[x] PACT[x]		Higher scores for Realism Scepticism, Attention, & Influence associated with greater downward appearance comparison (PACT; *d* = 0.54); with lesser internalisation of the thin-ideal (SATAQ-I; *d* = 0.32, trend); with lesser importance of appearance (MBSRQ-AO; *d* = 0.39, trend); and with greater satisfaction with appearance (MBSRQ-AE; *d* = 0.43, trend). No association between Realism Scepticism, Attention, & Influence and body image (EDI-BD).
Engeln-Maddox & Miller (2008) *N* = 393	Adult (19)	Critical processing of beauty images scale[y] Questioning/accusing subscale (Influence; Attention)	EDI-BD MBSRQ - AE SATAQ-I SATAQ – AI		Higher scores for Influence & Attention associated with greater body dissatisfaction (EDI-BD; *d* = 0.49), internalisation of the thin and athletic ideal, and perceived media pressure (SATAQ-I; *d* = 0.77, AI;

Study	Age group (mean years)	Media-processing measure[z] (concept(s) assessed)	Body image and related measures	Eating measures	Results
Gender F 100%		Too thin subscale[y] (Attention) Fake subscale[y] (Realism scepticism; Techniques)	SATAQ – P SATAQ-M		*d* = 0.80; P; *d* = 1.04), and with lesser body satisfaction (MBSRQ-AE; *d* = 0.54). Higher scores for Attention associated with higher scores for internalisation of the athlete ideal (SATAQ-AI; *d* = 0.32). Null results for other relationships. Fake subscale not associated with any body image or related measures.
McLean et al. (2013) *N* = 469 Gender F 100%	Adol. (13)	Media attitudes questionnaire (Realism scepticism; Similarity scepticism; Desirability scepticism)	EDEQ-WS SATAQ-I PACS		Higher scores for Realism scepticism, Similarity scepticism & Desirability scepticism associated with lesser weight and shape concern (EDEQ-WS; *d* = 0.41), internalisation of the thin-ideal (SATAQ-I; *d* = 0.95) and appearance comparison (PACS; *d* = 0.56).
Nathanson & Botta (2003) *N* Adol. = 149 *N* Adult = 160 Gender Adol F 62% Adult F 68%	Adol. (16) Adult (21)	Processing of incidental content[y] (Attention)	EDI-BD EDI-DT SCP[y]	EDI-B ANB[y]	Higher scores for Attention associated with greater drive for thinness (EDI-DT; *d* = 0.98) in adolescents. Data for other relationships between Attention and outcome variables not available for adolescents or adults.
Sherwood & Neumark-Sztainer (2001) *N* = 234 Gender F 100%	Child (11)	Knowledge of media influences (Influence; Expectancies)	BSS SATAQ-I ABBS	DIET[y] WLP[y]	No differences in Influence & Expectancies scores between dieters and non-dieters. Relationships between Influence & Expectancies and outcome variables not available.
Zucker et al. (2005) *N* = 942 Gender F 100%	Adult (34)	Advertising scepticism (Filter; Influence; Values)	WC		No association between scores for Filter, Influence & Values and scores for weight concern (WC).

Table 3

Characteristics and Results of Experimental Intervention Studies Included in the Review

Study	Age group (mean)	Media-processing measure[z] (concept(s) assessed)	Body image & related measures	Eating measures	Intervention sessions	Change in media processing variables	Change in body image/eating variables
Golan et al. (2013) *N* ITV=210 *N* CTL=49 Gender F 58%	Adol. (14)	Media strategies[y] (Profit)	EDI-BD EDI-DT	EAT	Media literacy and dissonance health program vs control; Total 8 x 90 min (1 x media literacy)	Improvement in Profit scores (expected) in ITV vs CTL from baseline to post-program (d = 0.37) and to 3-month follow-up (d = 0.33). (Analyses combined for girls and boys.)	Improvement in body image (EDI-DT; expected) in ITV vs CTL from baseline to post-program to 3-month follow-up (d = 0.39). No group by time effects for EDI-BD or EAT. (Analyses combined for girls and boys.)
Irving & Berel (2001) *N* ITV=27 *N* ITV=31 *N* ITV=28 *N* CTL=24 Gender F 100%	Adult (19)	Media attitudes questionnaire (Realism scepticism; Similarity scepticism; Desirability scepticism; Internalisation; Scepticism about Expectancies; NC)	EDI-BD PASTAS-W SATAQ-I SATAQ-A		Media literacy interventions. Externally oriented (1 x 45 mins); vs internally oriented (1 x 45 mins); vs video (1 x 15 mins); vs control	Greater Realism scepticism (expected) at post-program (controlling for baseline) in internally oriented (d = 0.88) and video (d = 0.89) ITV vs CTL; greater Similarity scepticism in all ITV groups (external d = 1.26; internal d = 1.00; video d = 1.36) vs CTL; and greater Desirability scepticism in externally oriented (d = 0.75) vs CTL. No differences between groups for other variables.	No differences between any ITV and CTL at post-program (not controlling for baseline) for any variables.
Irving et al. (1998) *N* ITV=17 *N* CTL=24	Adol. (15)	Media attitudes questionnaire[y] (Realism scepticism; Desirability scepticism;	EDI-BD PASTAS-W SATAQ-I SATAQ-A		1 x media literacy (unspecified duration) vs control	Greater Realism scepticism (expected) at post-program (not controlled for baseline) for ITV vs CTL (d = 1.13). No differences between groups for other variables.	Lower scores (expected) at post-program (not controlled for baseline) for internalisation of the thin-ideal for ITV vs CTL (d =

Study	Age group (mean)	Media-processing measure[z] (concept(s) assessed)	Body image & related measures	Eating measures	Intervention sessions	Change in media processing variables	Change in body image/eating variables
Gender F 100%		Internalisation; Scepticism about Expectancies)					0.68). No differences between groups for other variables.
Kater et al. (2000) *N* ITV=222 Gender NS	Child (NS)	Critical thinking about media messages[y] (Similarity scepticism)	NS[y]. Example items: "I wish I were thinner" "How do you feel about how you look"	DI[y]	Healthy body image and eating disorder prevention curriculum. Total 10 x unspecified duration (1 x media literacy)	At post- compared with pre-intervention more participants endorsed Similarity scepticism (expected). (Not tested with inferential statistics, therefore effect sizes not calculated.)	Lower proportion (expected) of participants endorsed questions indicative of body dissatisfaction at post-intervention compared with pre-intervention. (No inferential statistics, so no effect sizes.)
Neumark-Sztainer et al. (2000) *N* ITV=115 *N* CTL=111 Gender F 100%	Child (11)	Knowledge of media influences[y] (Influence; Expectancies)	BSS SATAQ-I ABBS[y]	DB[y] UWLB[y] BE[y]	Body acceptance and dieting prevention via media literacy and advocacy. Total 6 x 90 mins (3 x media literacy)	Trend (p = .06) for higher scores (expected) for Influence & Expectancies for ITV vs CTL at post-program (d = 0.26) and 3-month follow-up (p = .06; d = 0.35) (controlling for baseline).	Higher scores (expected) for body size acceptance (ABBS) for ITV vs CTL at post-program (d = 0.34) (controlling for pre-program). Lower scores (expected) for internalisation of the thin-ideal for ITV vs CTL at 3-month follow-up (d = 0.27) (controlling for pre-program). No differences for other variables.
Posavac et al. (2001) *N* ITVa=25 *N* ITVb=25 *N* ITVc=25 *N* CTLa=25	Adult (NS)	Critical media consumption[x] (Realism scepticism)	EDI-BD BES-W		Media literacy video interventions presented prior to viewing thin-ideal media images.	ITV (pooled) vs CTL participants were more likely to report Realism scepticism responses (expected) post intervention (not controlled for baseline) and media viewing (d = 0.72). Combined ITV vs (either)	Lower (expected) weight concern (BES-W) at post-intervention/media exposure (not controlling for baseline) for ITV (all

Study	Age group (mean)	Media-processing measure[z] (concept(s) assessed)	Body image & related measures	Eating measures	Intervention sessions	Change in media processing variables	Change in body image/eating variables
N CTLb=25 Gender F 100%					Artificial beauty (1 x 7 mins); vs genetic realities (1 x 7 mins) vs combined (artificial beauty/genetic realities x 7 mins); vs control	singular ITV participants more likely to report Realism scepticism responses post intervention (not controlled for baseline) and media viewing (d = 0.77).	interventions) vs CTL participants (d = 0.74). Differences for body dissatisfaction (EDI-BD) not assessed.
Richardson, Paxton, & Thompson (2009) *N* ITV=147 *N* CTL=130 Gender F 46%	Adol. (13)	Media literacy[y] (Techniques; Influence)	EDI-BD BS-VAS SATAQ-I PACS	EDI-B EDEQ-R	Body image and self-esteem program vs control (no intervention). Total 4 x 50 mins (1 x media literacy)	Girls: Higher scores (expected) for Techniques at post-program (d = 0.87, 0.87, 0.81) and 3-month follow-up (d = 0.54, 0.51, 0.65) (controlling for baseline) for ITV vs CTL participants. No group differences for Influence. Boys: Higher scores (expected) for Techniques at post-program (d = 0.52) and 3-month follow-up (d = 0.74; d = 0.57; d = 0.38) (controlling for baseline). Trend for higher scores (expected) at post-program for Influence (d = 0.40) for ITV vs CTL participants.	Girls: Lower (expected) internalisation of the thin-ideal scores at post-program (d = 0. 53) (controlling for baseline) for ITV vs CTL participants. Trend for lower scores (expected) for appearance comparison at post-program (d = 0.46) and 3-month follow-up (d = 0.38) (controlling for baseline) for ITV vs CTL participants. Boys: Higher body satisfaction (BS-VAS) scores (expected) at post-program (d = 0.46) and 3-month follow-up (d = 0.45) (controlling for baseline) for ITV vs CTL participants.

Key for Tables 2 and 3

[x] measure coded and quantified from participant responses (e.g., thought listing technique); [y] items derived or adapted by original study authors; [z] measure name provided in original paper

NC - not coded; NS – not specified; ITV = intervention group; CTL = control group; Adol = adolescent

Media processing measures.

Advertising scepticism[21]; Critical media consumption[20]; Critical processing[6]; Critical processing of beauty images scale[7]; Critical thinking about media messages[17]; Critical viewing[2]; Knowledge of media influences[19]; Media attitudes questionnaire[16]; Media images as realistic ideal[2]; Media literacy[23]; Media strategies[13]; Processing of incidental content[18].

Body image measures.

BES-W = Body Esteem Scale - Weight Subscale[9]; BSS = Body Satisfaction Scale[25]; BS-VAS = Body Satisfaction Visual Analogue Scale[5;14]; EDEQ-WS = - Weight and Shape concern subscales[8]; EDI - BD – Eating Disorders Inventory – Body Dissatisfaction subscale[10;11]; EDI - DT – Eating Disorders Inventory – Drive for Thinness subscale[10]; MBSRQ – AE; = Multidimensional Body-Self Relations Questionnaire - Appearance Evaluation Subscale[4]; MBSRQ – AO = Appearance Orientation Subscale[4]; MUSC = Desire for Muscularity[3]; WC = Weight Concern and Preoccupation[1].

Body-related attitude measures.

ABSS = Acceptance of Body Shape and Sizes (adapted by authors from SATAQ)[19]; NACT = Negative (upward) Appearance Comparison Thoughts (responses by participants to media viewing)[6]; PACS = Physical Appearance Comparison Scale[26]; PACT = Positive (downward) Appearance Comparison Thoughts (responses by participants to media viewing)[6]; PASTAS-W = Physical Appearance State and Trait Anxiety Scale – Weight[22]; SAC = State Appearance Comparison[28]; SATAQ-A = Sociocultural Attitudes Towards Appearance Questionnaire – Awareness subscale[15]; SATAQ-AI = Athlete Internalization subscale[27]; SATAQ-I = Internalization of the thin-ideal subscale[15;27]; SATAQ-M = Media as information source about appearance subscale[27]; SATAQ-P = Pressures subscale[27]; SCP = Social Comparison Processing[18].

Disordered eating and weight control measures.

ANB = Anorexic Behaviours (adapted by authors from eating attitudes test) [3]; BE = Binge Eating[19]; DB = Dieting Behaviours[19]; DI = Dieting Intentions[17]; DIET = Current Dieting[24]; EAT = Eating Attitudes Test[12]; EDEQ-R – = Eating Disorders Examination-Questionnaire – Restraint[8]; EDI-B – Eating Disorders Inventory – Bulimia subscale[10;11]; UWLB = Unhealthy Weight Loss Behaviour[19]; WLP = Weight Loss Practices[24].

Superscript numbers refer to references for measures as shown in the reference list in the online Supplementary Materials linked to this article(S2).